9.0 Cost Analysis

The US Highway 53 Virginia to Eveleth Draft Environmental Impact Statement (EIS) (December 2014) is incorporated by reference and is considered part of the Final EIS. Parts of Chapter 9 from the Draft EIS are repeated here, but sections have been abbreviated.

9.1 Changes Since the Draft EIS

The cost estimates for the preferred alternative have been further evaluated as final design has progressed, and the estimated project costs remain in the cost range previously identified and listed below.

The changes in project description, additional right-of-way acquisition and relocation, and noise walls, described in previous chapters of the Final EIS, have been factored into the cost estimate.

9.2 Capital Costs

9.2.1 Capital Costs of the Preferred Alternative

There are a number of factors that were included in developing a preliminary estimate of costs for the preferred alternative. These included estimates for:

- Construction: includes preliminary estimates for mobilization, removals, excavation, materials (i.e., pavement, aggregate), traffic control/signing and striping, storm sewer and drainage, turf establishment and erosion control, bridges, culverts, retaining walls, noise walls, lighting, and traffic signals, and other miscellaneous construction costs. Also includes 12 percent for professional services necessary to complete construction. Construction costs were inflated to 2015 dollars to reflect anticipated year of construction.
- Right-of-Way/Land/Mitigation: includes estimated right-of-way acquisition (permanent; in perpetuity), relocation costs, air quality mitigation, mine operating expenses, mineral rights, and other compensation

Estimates for unit costs were reviewed and evaluated based on identified risks for cost variation, and a Monte Carlo simulation[1] was used to develop estimated cost ranges for each alternative based on these risks. Specific unit costs for ferrous and non-ferrous resources were not available at the time of this estimate and therefore were not specifically included; however, the cost ranges were set to cover a range of risks associated with these and other unknown costs and/or variability in cost factors. The cost range for the preferred alternative is separated into the construction and right-of-way/land/ mitigation cost categories described above and is provided in Table 9.1-1. The range shown is based on 30 to 60 percent design and information available at the time of Final EIS preparation. Additional cost factors, such as operation and maintenance costs, have not been included in these estimates at this time.

The Minnesota Department of Transportation (MnDOT) has evaluated the potential quantity and quality of ferrous and non-ferrous metallic resources within the path of the preferred alternative for property negotiation purposes. The results of this analysis can be made public after negotiations and the acquisition are complete.

[1] Monte Carlo simulation is a computerized mathematical technique that allows for risk in quantitative analysis and decision making to be taken into account. It furnishes the decision-maker with a range of possible outcomes and the probabilities they will occur for any choice of action.

Table 9.1-1. Range of Total Capital Costs for Construction of the Preferred Alternative[A, B]

Construction Cost	Right-of-Way/Land/Mitigation Cost	Total Capital Costs for Construction
$165-215 million	$15-25 million	**$180-240 million**

[A] Based on 2014 dollars; construction costs inflated to 2015 dollars. Does not include costs for maintenance/operation.
[B] The cost range includes the additional $4 million to construct the Interchange Option rather than the Intersection Option.

The description of the preferred alternative below is provided to illustrate the assumed components for the basis for project cost estimate. Changes to the design assumptions may occur as more information becomes known and as higher levels of engineering design are undertaken.

9.2.1.1 Preferred Alternative Description

The preferred alternative routes to the east, avoiding the active United Taconite (UTAC) mine boundary; however, it will require construction over the Rouchleau Pit. The Rouchleau Pit crossing is accommodated by a bridge structure. The bridge structure will cross between the east and west sides of the pit with abutments built high atop the presumed bedrock ridges at each side. For intermediate support within the 1,100-foot bridge length, two tall support piers 180 feet or taller will extend down to pile supported foundations built at approximately the existing water level elevation.

The preferred alternative preliminary cost estimate includes the following layout assumptions:

- US 53 reconstruction length of approximately 15,000 feet
- MN 135/US 53 interchange includes a compressed diamond configuration with one bridge, full access ramps, and a 25 percent contingency
- Access to 2nd Avenue is provided via an at-grade, signalized intersection
- Single, three span, 1,100-foot long steel plate girder bridge
    - Bridge crosses over the existing Rouchleau Pit
    - Extent of mined fill placed over bedrock within the pit is unknown. For determination of foundation piling lengths, estimate assumes a bedrock elevation at approximately 1,200 feet.

9.3 Project Delivery Method

MnDOT is using the Construction Manager/General Contractor (CMGC) project delivery method for roadway construction for this project. CMGC project delivery allows an owner (MnDOT) to engage a construction manager during the design process to provide constructability input. The CMGC contracting method offers benefits to MnDOT in terms of innovation, value, and speed.

The CMGC construction manager and the final design team has been selected for the project and will be working on design plans through 2015. At approximately an average of 60 percent to 90 percent design completion, the owner and the construction manager negotiate a "guaranteed maximum price" for the construction of the project based on the defined scope and schedule. If this price is within 10 percent of an independent estimate, a contract is executed for construction services, and the construction manager becomes the general contractor.[2] If the price is not within 10 percent, MnDOT prepares a variance report and tries to reconcile differences in pricing assumptions for items of work that differ by more than 10 percent. If reconciliation is possible, changes to the cost model and baseline schedule are made. If reconciliation is not possible, the CMGC contract could be terminated and the project procured through another method, or management could be consulted on the option to award the contract.

Although the CMGC construction manager's scope of work includes providing technical assistance during the NEPA process, the construction manager does not have any role in the preparation of NEPA documentation or any decision-making responsibility with respect to the NEPA process. The CMGC

[2] http://www.fhwa.dot.gov/construction/cqit/cm.cfm

contract includes appropriate provisions ensuring that all environmental and mitigation measures identified in the NEPA document are implemented.

MnDOT will use a "green sheet" tracking system to document and manage all environmental and design commitments made for the US 53 project through the EIS and permit review process. Appendix E provides the green sheets developed for the preferred alternative to date, and will be updated as permits are obtained.

9.4 Available Funding

9.4.1 Estimate of Cost

The estimated total project cost of the preferred alternative (in 2015 dollars) is $180 to $240 million.

9.4.2 Anticipated Funding

The funds allocated for the proposed project (SP 6918-80, SP 6918-84, and SP 6918-86) are a combination of federal and state funds.

- Federal: $30 million (National Highway Performance Program – NHPP)
- State Trunk Highway Bonds: $60 million (Chapter 152); up to $140 million (Chapter 5)
- State General Obligation Bonds: $19.5 million

These funds will be used for right-of-way, preliminary engineering, and construction. Of the $140 million of Trunk Highway Bonds, MnDOT currently has $94 million in the approved Fiscal Year 2016 State Transportation Improvement Program (STIP) for preliminary engineering and initial construction. Combined, these funding sources cover the anticipated range in capital costs for this project.